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Standard Test Method for GROSS CALORIFIC VALUE OF COAL AND COKE BY THE ISOPERIBOL BOMB CALORIMETER¹

This standard is issued under the fixed designation D 3286; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—The term “isothermal-jacket” was replaced editorially by the word “isoperibol” in the title and in 1.1 and 4.1 in December 1986.

1. Scope

1.1 This test method covers the determination of the gross calorific value of coal and coke by the isoperibol bomb calorimeter.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Specific precautionary statements are given in Section 9.*

2. Referenced Documents

2.1 ASTM Standards:

- D 121 Definitions of Terms Relating to Coal and Coke²
- D 346 Method of Collection and Preparation of Coke Samples for Laboratory Analysis²
- D 1193 Specification for Reagent Water³
- D 2013 Method of Preparing Coal Samples for Analysis²
- D 3173 Test Method for Moisture in the Analysis Sample of Coal and Coke²
- D 3177 Test Methods for Total Sulfur in the Analysis Sample of Coal and Coke²
- D 3180 Method for Calculating Coal and Coke Analyses from As-Determined to Different Bases²
- D 4239 Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods²

E 1 Specification for ASTM Thermometers⁴

E 144 Recommended Practice for Safe Use of Oxygen Combustion Bombs⁵

3. Terminology

3.1 Definitions:

3.1.1 *calorific value*—the heat produced by combustion of a unit quantity of a substance under specified conditions. It is expressed in this test method in British thermal units per pound (Btu/lb). Calorific value may also be expressed in calories per gram (cal/g) or in the International System of Units (SI), joules per gram (J/g), when required. The unit equivalents are given in Table 1.

3.1.2 *gross calorific value (gross heat of combustion at constant volume), Q_v (gross)*—see Definitions D 121.

3.1.3 *net calorific value (net heat of combustion at constant pressure), Q_p (net)*—see Definitions D 121.

3.1.4 *calorimeter*—as used in this test method, consists of the bomb and its contents, the calorimeter vessel (bucket) with stirrer, the water in which the bomb is immersed, and the portions of the thermometer and the ignition leads within the calorimeter vessel.

¹ This test method is under the jurisdiction of ASTM Committee D-5 on Coal and Coke and is the direct responsibility of Subcommittee D05.21 on Methods of Analysis.

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² *Annual Book of ASTM Standards*, Vol 05.05.

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ *Annual Book of ASTM Standards*, Vol 14.01.

⁵ *Annual Book of ASTM Standards*, Vol 14.02.